

**FISCAL YEAR 2003
MONITORING AND EVALUATION REPORT**



LAND and RESOURCE MANAGEMENT PLAN

November 2004

APPROVAL AND DECLARATION OF INTENT

I have reviewed the FY 2003 Monitoring and Evaluation Report for the Chippewa National Forest that was prepared by an interdisciplinary team during the summer 2004. The Monitoring and Evaluation Report meets the intent of both the Forest Plan (Chapter V) as well as the regulations contained in 36 CFR 219.

This report is approved:

NORMAN L. WAGONER
Forest Supervisor

Date

The United States Department of Agriculture (USDA) Forest Service is a diverse organization committed to equal opportunity in employment and program delivery. USDA prohibits discrimination on the basis of race, color, national origin, sex, religion, age, disability, political affiliation, and familial status. Persons believing they have been discriminated against should contact the Secretary, U.S. Department of Agriculture, Washington, D.C. 20250, or call 202-720-7237 (voice), or 202-720-1127 (TTY).

EXECUTIVE SUMMARY

FISCAL YEAR 2003 MONITORING & EVALUATION REPORT

Chippewa National Forest

We have been monitoring and evaluating the 1986 Land and Resource Management Plan (Forest Plan) implementation since its approval. Our Monitoring and Evaluation plan is described in Chapter V of the Forest Plan. We've monitored actual outputs against predicted outputs, how well we implemented standards and guidelines, how well those standards and guidelines protect forest resources, and whether or not our actions are moving the Forest toward the long-term desired future conditions described in chapter IV of the Forest Plan. Monitoring plays a crucial role in surfacing irregularities or areas that may require change.

Forest Plan Revision

The Chippewa and Superior National Forests worked together to revise their Forest Plans. A separate Forest Plan was prepared for each National Forest. Since the 1986 Forest Plan, there have been considerable changes in conditions on the Forest, shifts in public demands, technological advances, and a better understanding of forest ecosystems that are reflected in the Revised Forest Plan.

The Final EIS and Forest Plan were released in July 2004. The Regional Forester signed the Record of Decision (ROD) on July 30, 2004. Modified Alternative E is the selected alternative. Implementation of the revised Forest Plan began 30 days after the Notice of Availability of the final environmental impact statement was published on August 13, 2004 in the Federal Register. A legal notice in the *Milwaukee Journal-Sentinel* on August 27, 2004 began the 90-day appeal period. Notice was also published in *Bemidji Pioneer* and the *Grand Rapids Herald Review*. Additional information can be found on the Chippewa National Forest website: www.fs.fed.us/r9/chippewa. The revised Forest Plan will guide management of the Chippewa National Forest for the 10 to 15 year period following approval. The plan is strategic in nature, with an emphasis on ecological, social, and economic sustainability over the long-term.

Implementation of the 2004 Forest Plan is just beginning. This report pertains to the monitoring and evaluation of activities in accordance with the 1986 Forest Plan.

Key Events in 2003

Red Pine Retention Study

North Central Research Station is conducting this study in cooperation with the Chippewa National Forest and University of Minnesota. The study area is located in the Tamarack Point area of the Chippewa National Forest.

In currently managed, naturally regenerated and planted red pine stands, there is minimal variation in

structure and composition relative to historic conditions. The study is designed to create red pine stands that more closely represent past ecosystems. This study uses partial harvests to reduce stands to the same basal areas but leaves remaining overstory trees in different spatial patterns on the landscape. The patterns include large gaps, small gaps, and traditional, evenly spaced thinning. Jack, red and eastern white pine were planted in the understory to increase structure and composition. The varying spatial patterns and densities of the overstory will be compared to the effects on growth and survival of regeneration, understory composition, site productivity, avian communities and disease incidence. Results will be monitored for 5+ years after treatment.

Logging began in August 2002 and was completed in April 2003. Planting was done in May 2003. The first summer of data collection occurred in 2003. Preliminary results are not yet available. Researchers have hosted several field trips to the site to discuss the study objectives, methodology, and data collection.

The Big Lake Management Plan Environmental Assessment covered this study (1999). The establishment report and study Plan is *Restoring Stand Complexity in Managed Red Pine (Pinus resinosa) Ecosystems Using Overstory Retention and Understory Control*, (Palik, Zasada, and Kern, 2003).

Annual Activity Review

In 2003, members of the Forest Leadership Team and several other forest employees spent a day reviewing five projects on the Deer River/Marcell district. The projects reviewed represented fisheries watershed, recreation, and vegetation management programs. The following projects were reviewed:

- Spring Lake Creek Spawning Riffle Project
- Conifer Plantation Management (1998)
- Onegume Campground Rehab
- Little Cut Foot Sioux Boat Access
- Tamarack Point Prescribed Burn

Projects were reviewed to determine if what was implemented matched what was planned in the environmental and decision documents. More specifically, projects were examined to determine if treatments or project design incorporated the necessary standards and guidelines, mitigation measures, and design features identified during planning, were specified in contracts, and occurred on the ground.

The Spring Lake Creek Spawning Riffle is a fisheries and watershed improvement project that involved successful partnerships with the Minnesota Department of Natural Resources and Jessie Lake Association. The project manager worked closely with the contractor to effectively address a number of resource concerns during implementation. In addition, the project manager also coordinated and supervised lots of volunteers to accomplish the project objectives.

The Conifer Plantation Management EA (1998) covers commercial thinning in a number of plantations. The project is a good example of the forest responding to new information that surfaced after a decision was made but prior to the implementation of the project. During this time period, a goshawk nest was found, lynx was listed as a threatened species, and a list of Regional Forester's Sensitive Species came

out. A review of the project occurred, a Supplemental Information Report was written, and prescriptions were modified to incorporate the new information.

The Onegume Campground Rehab project was designed to upgrade the facilities of the campground—install electrical pedestals, improve the water system, remove a temporary dock, increase the length of campsite spurs to accommodate larger vehicles, and construct a fish cleaning station—yet maintain the character of the campground. Improvements have resulted in increased campground use and the desired change of some use patterns that were causing resource damage/concerns. It appears that the revenues generated through campground fees will cover the costs of the investments made in the campground. This project is another good example of scheduling construction activities to minimize disturbance to an eagle nest in the vicinity.

The Little Cut Foot Sioux Boat Access was designed to modify the existing access that was within 50 feet of the lake shore and did not meet the Forest Plan standard of maintaining a buffer. In addition, the original access was congested, had poor traffic flow, was rutted, and added runoff and sedimentation to the lake. The new design incorporated a 50 foot buffer along the shoreline, improved parking and traffic flow, and reduced runoff, sedimentation and erosion. This project is also a success story about effectively working with our neighbors. In this instance, support for the project was achieved after several informal meetings during which an individual's concerns were heard, addressed, and resulted in a more positive and effective working relationship.

At the Tamarack Point Burn unit, the risks associated with burning, the support of the public and area residents, and monitoring the results of our burns were examined more closely. The potential for firelines to provide new routes for ATV users was not anticipated or addressed during the planning phase of the project and was identified as a potential future issue.

Overall, projects were well implemented and within the scope of the environmental documents. Forest Plan standards and guidelines, best management practices (BMPs) and mitigation measures were applied on the ground. Contract administrators effectively enforced the contract specifications and mitigation measures to achieve the desired outcome. Mitigation measures for the projects reviewed were effective.

In summary, our monitoring results and evaluations indicate that we are implementing the Forest Plan adequately and, in some cases, better than adequately. Through timber harvesting, we are close to meeting the Age Class Distribution as planned for year 2000 (p. IV-208). Threatened, Endangered, and Sensitive and Management Indicator Species have not been adversely impacted. Management strategies have resulted in the increase in the wolf and eagle populations in the area. Soil and water quality were not adversely impacted. All of our programs are managed within Forest Plan direction and within the limits of funding received from the United States Congress.

Public Involvement

We continue to publish the *Chippewa National Forest Quarterly*, a schedule of proposed actions and decisions that implement the Forest Plan. We encourage the public to become part of our management process by commenting on project proposals through the NEPA process. Information about planning can be found on the Internet at www.fs.fed.us/r9/chippewa.

MONITORING & EVALUATION REPORT

TABLE OF CONTENTS

	<u>Page</u>
APPROVAL AND DECLARATION OF INTENT	ii
EXECUTIVE SUMMARY	iii
INTRODUCTION	vii
I. AMENDMENTS TO THE FOREST PLAN	1
II. PROGRAM FUNDING	1
III. MONITORING RESULTS AND EVALUATION	2
A. VEGETATION COMPOSITION	3
B. TIMBER	7
C. NATIONAL FOREST MANAGEMENT ACT (NFMA) REQUIREMENTS	11
D. WILDLIFE AND FISH	12
E. GOBLIN FERN (<i>BOTRYCHIUM MORMO</i>)	19
F. RECREATION	19
G. HERITAGE RESOURCES	22
H. INTERPRETATION OF NATURAL AND HISTORIC AREAS	22
I. ROADS	24
J. SOIL	25
K. WATER - LAKES AND STREAMS	27
L. LANDS	30
IV. LIST OF PREPARERS	32

MONITORING & EVALUATION REPORT

INTRODUCTION

The Chippewa National Forest Land and Resource Management Plan (Forest Plan) was approved in June 1986, and implementation began that same year. The National Forest Management Act Planning regulations specify that, "at intervals established in the Forest Plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based on this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revisions, or amendments to the Forest Plan as are deemed necessary." This report summarizes and evaluates the results of monitoring Forest Plan implementation in fiscal year 2003.

I. AMENDMENTS TO THE FOREST PLAN

There have been no amendments approved since 1996. The Chippewa National Forest decided that initiating or processing minor amendments concurrently with the revision process might confuse our constituents and require us to divert funding and staffing for Forest Plan changes that could be incorporated into the revised Plan.

II. PROGRAM FUNDING

A. Congressional Allocations

Budgets are allocated annually (our fiscal year runs from October 1 through September 30) by the US Congress, in amounts and mixes that reflect Congressional priorities and desires. White House Administration objectives and Forest Service national and regional priorities further influence Forest budgets.

Budget numbers for the last five fiscal years (FY) are expressed in 2003 dollars by using the implicit price deflator. Numbers reflect dollars allocated by Congress and do not include partnership dollars from other organizations.

Table 1: Budget allocation by FY

<i>FY</i>	<i>Total Budget (Millions)</i>
99	11.356
00	10.729
01	11.930
02	12.740
03	12.749

B. Partnerships, Grants & Agreements

We continue to seek partnerships with other public and private organizations and volunteers to assist us in meeting the Forest goals and in conducting Forest Plan monitoring and evaluation. Partners and volunteers benefit us in two ways; they leverage the funding we receive from Congress and they promote public involvement in National Forest management.

In 2003, the Forest had 36 active partnerships that provided over \$200,000 in support to our recreation, wildlife, heritage resources, wildland fire, fisheries management, and watershed programs.

Some examples are: partnering with the Minnesota Department of Natural Resources (MN DNR) for improvements to the Plughat Point boat access parking lot; conducting an ecosystem assessment of the *Botrychium Marmo* with Gustavus Adolphus College; working with the Leech Lake Band of Ojibwe (LLBO) to improve Common Tern nesting habitats; providing a summer naturalist program with the Marcell Family Center; working with MN DNR & LLBO Dept. of Resource Management for wildlife habitat improvement through prescribed burning; providing internships for Itasca Community College students in the fire program and GIS areas; conducting heritage surveys with LLBO; partnering with MN DNR for improvements to Jessie Lake fish habitat; soil testing at the St. Regis Superfund Site with the MN Chippewa Tribe.

The Forest Service extended its Intergovernmental Personnel Act (IPA) agreement for another two years

to provide an employee as Program Leader/Instructor at Itasca Community College for the wildland firefighting program. This partnership will continue through 2005.

Changes were also made with how the FS activates local Volunteer Fire Departments (VFD) for assistance on wildland fires and prescribed burns. New Cooperative Fire Protection agreements were established with 5 VFD's within the boundaries of the Chippewa National Forest. These agreements will take the place of Emergency Equipment Rental Agreements (EERA's) that had been established in previous years. The FS expects to establish more Cooperative Fire Protection agreements with local VFD's in the next few years.

III. MONITORING RESULTS AND EVALUATION

Monitoring and evaluation are separate, sequential activities. Their purpose is to provide information that will help determine whether Forest Service programs are meeting the Forest Plan direction from both the quality and quantity standpoint. This direction includes goals and objectives, management prescriptions, and standards and guidelines. The end result of these activities is a decision regarding the need for change in the Forest Plan.

Monitoring - The purpose of monitoring is to observe and record the results of actions. The information collected through this process is used to determine:

- If Forest Plan goals and objectives are being achieved,
- If management prescriptions are applied as directed by the standards and guidelines,
- If the results of applying the prescriptions address the management problems, issues, concerns and opportunities, and
- If significant effects are occurring as predicted.

There are two criteria that determine monitoring requirements. They are (1) monitoring needs required by federal regulations such as the 1982 Planning Rule (36CFR 219) and the National Forest Management Act (NFMA) and (2) considerations found to be significant and linked to the resolution of public issues, management concerns, resource development opportunities and corresponding environmental effects.

Monitoring consists of the collection of information from selected sources on a sample basis. The frequency, precision, and reliability of the sample are based on the relative importance and associated risk of the parameter being monitored, the natural variation of the parameter, and the technology and resources available. A full spectrum of data collection techniques are used including:

- Site-specific observations by specialists,
- Field assistance trips,
- General field observations,
- Management attainment reporting system,
- Formal management reviews on a scheduled basis, and
- Discussions with other agencies and general public users.

Evaluation determines how well actual results are meeting Forest Plan direction and consequently, whether the Plan needs to be changed.

Forest Plan Monitoring Direction --- Direction for the Chippewa National Forest's monitoring and evaluation effort is contained in Chapter IV of the Forest Plan. This specific monitoring plan is included in Chapter V of the Forest Plan.

The following sections display monitoring results and evaluation of outputs and accomplishments, compliance with standards and guidelines, NFMA requirements, measured effects of implementation, management indicator species, and candidate sensitive species. Rationale for proposed changes to the Forest Plan and research needs may also be discussed within this section.

A. VEGETATION COMPOSITION

The information provided below is a repeat of what was presented in the combined 2000, 2001 and 2002 Monitoring and Evaluation Report. The data presented in that report was based on queries done in 2003 of our corporate database.

1. Composition and Age Class

Vegetative composition can be depicted as age classes by forest timber type groups as shown in the 1986 Forest Plan on page IV-208. In Table 2 below, Forest Plan planned age class distribution for the year 2000 (taken from page IV-208) and the existing the age class distribution by forest type groups for the years 2000 and 2003 are displayed. Numbers for the existing acres for 2000 and 2003 were obtained by querying the corporate database.

The Chippewa National Forest has implemented the Forest Plan through active management, working *towards* a desired age class distribution for each forest type group. The forest is close to meeting the 2000 planned age class distribution, particularly for the younger age classes, for the short rotation conifer, long rotation conifer, and aspen. Some differences in percentages can be explained in part by:

- Acquisitions or land exchanges where the timber types differ.
- Retyping during field inventory as a result of changing standards and forest succession resulting from mortality of old jack pine, balsam fir, and paper birch.
- A shift from aspen and short rotation conifer to long rotation conifer, short rotation conifer to aspen, hardwoods to conifer or aspen, and aspen to upland opening.

The Chippewa Forest Plan, unlike some other forest plans in the Region, does not identify forest type group age class goals by management area. Consequently, when doing analysis for project areas, it is not possible to compare the existing timber type composition by management area and the age class within each type.

2. Results:

When looking more closely at **Table 2, Age Class Distribution, Planned and Existing, for 2000 – 2003**, the numbers suggest the following.

a. Short Rotation Conifer Type Group– consists of jack pine and balsam fir types.

Existing acreage of short rotation conifer in 2000 was 6,610 acres (18%) less than planned. The actual 0-20 age class for 2000 was 1165 acres less than planned, 28% of the type group compared to the planned 26%. In mixed pine stands typed as jack pine, red pine often succeeds the less tolerant and shorter-lived jack pine associate. Jack pine removed either through mortality or harvest left behind a red pine forest type. If stands were regenerated, sites were sometimes reforested with red pine. In either scenario, these acres would be reflected in increased acreage of long rotation conifer.

Table 2: Age class distribution planned and existing for 2000 and 2003.

Timber Type/Age Class	Planned (00)	%	Existing (00) all acres	%	Existing (03) all acres *	%
Short Rotation Conifer						
0-20	9,725	26	8,560	28	8,905	31
21-40	541	1	819	3	940	3
41-60	1,860	5	2,950	10	1,999	7
61-80	23,946	64	13,521	43	11,731	40
81+	1,338	4	4,950	16	5,488	19
	37,410		30,800		29,063	
Long Rotation Conifer						
0-20	7,805	10	13,765	15	10,794	12
21-40	16,023	20	31,755	36	31,913	34
41-60	40,816	52	6,609	7	8,974	10
61-80	553	1	12,271	13	12,008	13
81-100	223	0	13,968	15	13,765	15
101-120	13,110	17	9,186	10	10,721	12
121-140	0	0	2,303	3	2,853	3
141-160	77	0	178	0	485	<1
161-200+	0	0	1,314	1	1,010	1
	78,607		91,349		92,523	
Lowland Conifer						
0-20	6,298	11	2,624	3	2,169	3
21-40	719	1	1,742	2	2,216	3
41-60	175	0	3,590	5	3,090	4
61-80	18,494	31	10,957	14	9,487	12
81-100	333	1	19,922	26	19,450	26
101-120	32,875	55	24,111	32	24,739	32
121+	415	1	12,999	17	14,848	20
	59,309		75,945		75,999	
Hardwoods						
0-20	6,310	5	3,211	2	5,257	4
21-40	610	1	987	1	971	1
41-60	0	0	5,804	4	3,806	3
61-80	89,900	68	63,462	48	54,797	42
81-100	218	0	35,406	27	39,401	30
101-120	34,748	26	15,317	12	16,922	13
121+	404	0	8,243	6	9,272	7
	132,190		132,490		130,426	
Aspen						
0-10	51,701	22	45,413	20	32,042	14
11-20	55,828	24	47,273	22	59,519	27
21-30	39,101	17	40,050	18	38,855	17
31-40	30,294	12	18,226	8	25,433	11
41-50	780	0	6,899	4	8,532	4
51-60	0	0	9,399	4	7,057	3
61-70	41,644	18	29,137	10	18,468	8
71+	16,602	7	32,520	14	37,197	16
	235,950		228,917		227,103	

Within the last few years, the forest has harvested a significant portion (almost 50%) of jack pine type. Establishment of jack pine occurred in the wake of the logging shortly after the turn of the century and during the CCC era in the 1930s. Due to the rapid decline and mortality occurring within old stands of this forest type, there has been an emphasis on harvesting and reforesting these stands to maintain their productivity. Recently many of these sites are being successfully regenerated with jack pine using historical vegetative patterns as a guide.

Similarly, balsam fir types tend to be found in mixed species stands that often shifted to other types when the balsam fir died or the stand was regenerated.

Due to natural mortality and harvesting of mature and over-mature short rotation conifer stands at a faster rate than anticipated by the Forest Plan, there were approximately 6813 acres (18% of planned 2000 acreage) less in the 61+ age class than planned at 2000.

b. Long Rotation Conifer Type Group – consists of red pine, white pine, and white spruce types.

According to the figures, the forest has exceeded both the total acreage planned for 2000, and the acreage in both the 0-20 and 21-40 year age classes. As explained previously, this in part is a function of shifts in forest type rather than entirely a function of regenerating the long rotation conifers. With regard to older age classes at 2000, approximately 13,187 acres were planned to be older than 101 years, compared to 12,981 actual acres.

Since 1986, extensive acres of immature stands of red pine planted by the CCC in the 1930s and early '40s have been commercially thinned, some for the second or third time. Most stands planted in the 1960s have been thinned once. There are also considerable acres of young red pine stands planted in the 1970s and 1980s that would benefit from thinning in the near future as they move into a merchantable size class.

c. Lowland Conifer Type Group – consists of black spruce, cedar, tamarack, and mixed swamp conifer types.

As of 2000, only 2,624 acres were in the 0-20 years age class, compared to a planned total of 6,298. Regeneration of lowland conifers since 1986 has proceeded at a rate less than planned for a number of reasons. Old aspen and balsam fir stands in adjacent uplands were considered higher priority for regeneration than long-lived lowland conifers when considering size of temporary openings. Lowland conifer stands examined for harvest often contained trees less than merchantable size or volume. Cedar types or mixed conifer types with more than 20% cedar were deferred from harvest due to uncertainty of obtaining cedar regeneration. In the last few years, concerns about obtaining adequate regeneration and questions on the timber suitability of these stands have been raised. Suitability was re-analyzed during the Forest Plan revision. In addition, lowland conifer types often contain Regional Forester Sensitive plants.

Actual acreage of lowland conifer type group increased by 16,636 acres from 1986 to 2000. There has been no active management of lowland conifers to account for such a large increase. It appears that some acres formerly typed as non-forest lowland brush are now typed as lowland conifer. Some areas have flooded due to road construction and beaver dams.

d. Hardwood Type Group – consists of oaks, lowland hardwoods, northern hardwoods and paper birch types.

As of 2000, approximately 3,211 acres of hardwood type group were less than 20 years of age, compared to 6,310 acres planned. From 2000 – 2003, the amount of hardwood in the 0-20 year age

class increased to 5,257 acres. Since 1986, higher regeneration priority has been on short rotation conifer and aspen types, due to limited demand and market for hardwood and the expectation that hardwoods would survive longer than adjacent, early successional, aspen, balsam fir, and jack pine stands when considering size of temporary openings. Hardwood types on the Chippewa, in contrast to most of the region, generally produce poor quality products and are most often used for pulpwood or firewood.

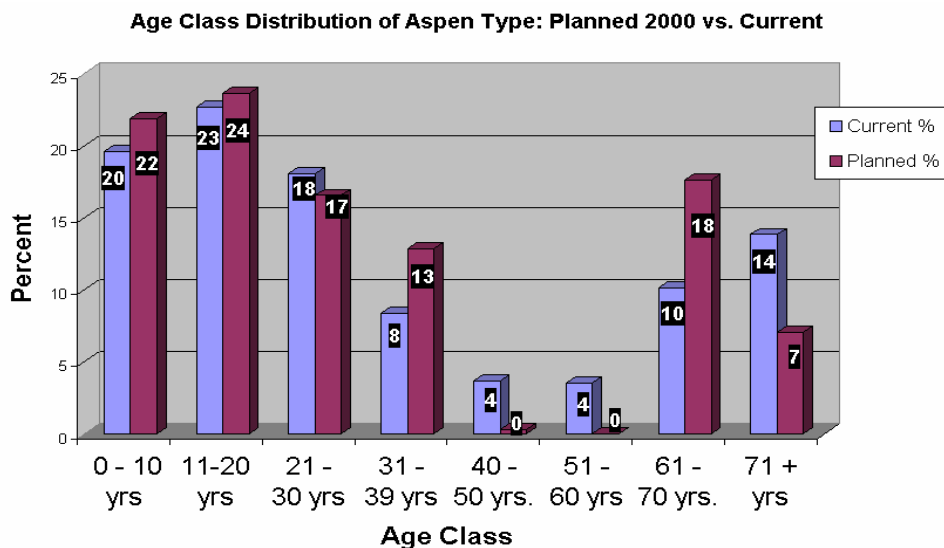
Type changes and loss of standing volume due to Dutch elm disease in the 1980s, drought and insect related mortality of oak and paper birch in the late 1980s, and continuing age related mortality of paper birch have not been assessed.

Hardwood stands provide important habitat for several TES species such as the goshawk, black-throated blue warbler, and older forest dependent species. Given the Forest Plan direction to maintain early successional forest types, and a pattern of intermingled private ownerships, these stands provide important habitat across the fragmented landscape for sensitive species. Management systems described in the Forest Plan focus are mainly even-aged systems, but given the disturbance ecology of many sites, and current wildlife issues, uneven-aged management may be more appropriate. This change is reflected in the Revised Forest Plan.

e. Aspen Type Group—consists of aspen and balsam poplar types.

Since 1986, there has been considerable emphasis on aspen harvest and management on the Forest. As indicated by the chart below, the 2000 age class distribution for the aspen type group is close to what the Forest Plan had projected.

- Within MAs 1.1, 1.2 and 1.3, emphasis has been on harvesting and regenerating aspen type group.
- Age class distribution the Plan prescribed for 2000 and what currently exists in 2003 are very close:
 - Regeneration of aspen during the last 30 years has resulted in existing age classes within 1-2 percentage points of the Plan projections. Since 1986, aspen has been clear cut 98% of the time, shelterwood cut 1%, and thinned 1% of the time.
 - The unbalanced age class distribution in aspen type group is evident in the small percentages of aspen in the 40-60 yrs classes.
 - Differences occur in the 61-70 and 71+ age classes, but when combined the forest currently has 24% of the aspen over 61 years while the plan projected 25%.



Existing species composition of mature (60+ yrs) aspen stands is variable and diverse.

- Stand typing was based on type and size class that dominates the site and will be managed to rotation age or until regenerated. Consequently, many mixed species stands are typed as aspen even though aspen may comprise 50% or less of the stand basal area. The composition of aspen stands varies across the forest. Given their existing composition, with time, natural succession would eventually convert most of these stands to balsam fir or more shade tolerant hardwood species such as red or sugar maple.

Harvest methods for aspen specified in the Forest Plan:

- "...the harvest methods to be used...apply to steady state stands in which the timber type to be regenerated is the same as that being harvested and in which the designated type constitutes a predominant percent of the trees in the stand." (IV-26)
- "...the matrix shows the timber types and the harvest methods appropriate for them. The circumstances that are listed encompass the vast majority of the stands to be harvested. It is recognized that there are a number of other possible circumstances (generally of a very specialized nature and requiring specialized methods)." (IV-26)
- Aspen – Clear cutting is the normal method with small clear-cuts also being used in retention and partial retention... (IV-27)
- Intermediate cutting in aspen, resulting in intensive management through the use of both commercial and precommercial thinning is specified. (IV-39).
- "An important objective in harvesting timber is to regenerate a stand to meet a number of resource management objectives. These include desired conditions for visual management, species composition, wildlife habitat, timber quality and integrated pest management. *Achieving the management objectives is foremost in selecting the harvest method* (emphasis added)." (Forest Plan, B-3)

3. Evaluation:

Emphasis in managing forest vegetation has been on harvesting and regenerating aspen, and short and long rotation conifer. Through timber harvesting, we are close to meeting the age class distribution in the aspen forest type group as planned for year 2000. Note however that there is an age class imbalance in the aspen in the 40-60 year old age classes and in the 60 year and older age classes for short rotation conifer.

Overall the acreage of short rotation conifer acres has decreased through due to a change to aspen, hardwoods, and long rotation conifer, both by natural processes and active management.

Long rotation conifer type group has increased due to a shift in aspen and short rotation conifer both from active management and natural processes.

B. TIMBER

1. Results:

In 2003 24.8 million board feet (MMBF) of timber were offered for sale and there were no "no-bid" sales. The reason for the difference between the "sold" and the "offer" is that some of the offerings did not sell during 2003 and likewise, some of the "sold" was not offered during 2003. During 2003 36.8 MMBF of timber was harvested.

The Forest Plan predicted a total of 121,100 acres to be sold with regeneration harvest during 1986-2003. The Chippewa actually sold 81,074 acres or 67% of the predicted acreage. The Forest scheduled 23,280 acres to be sold with intermediate harvest prescriptions during the period 1986-2003. The forest actually sold 29,320 acres or 126%. Combined overall accomplishment of acres sold for regeneration and intermediate harvests was 77% of planned.

The Forest Plan predicted that volume sold from conifer stands for the 1986 -2003 period would be 377.9 MMBF. Actual sold volume from conifer types through 2003 was 295.5 MMBF or 78% of the predicted amount. The Forest Plan predicted that volume from hardwood types (including aspen) from 1986 – 2003 would be 1087.4 MMBF. Sold volume from these stands through 2003 was 777.6 MMBF or 72% of the predicted amount. Overall volume sold was 73.2% of the predicted amount.

Each National forest provides payments to the counties in which they are located. National Forest lands are not on the county tax roles so counties must provide services while receiving taxes from fewer parcels of land than if National Forest lands were in private ownership and therefore part of the tax base. Therefore National Forests are required to make payments to counties in lieu of taxes and counties also receive a percentage of the receipts from the sale of natural resources. During FY 2003 total payments to the three counties (Beltrami, Cass and Itasca) were \$140,082, \$790,650 and \$765,223 respectively. The total of these payments was higher than the average annual total for the previous three years.

2. Evaluation:

Fiscal year 2003 is the 18th year of management under the 1986 Forest Plan. As the Forest Plan Revision process nears completion, many issues are being considered compared to the early years of the Plan. In order to address these issues and at the same time adhere to the standards and guidelines, varying approaches to analysis and management were used under the general guidance of the 1986 Forest Plan. This caused not only reduced accomplishment, but changes in the mix of harvest treatments as well. For example, during 2003 intermediate harvest acres sold accounted for 62% of the total acreage harvested, compared with an intermediate harvest percentage of 13% for the years 1986-1991 and 29% for the years 1992-1999.

Another result of adjusting timber harvest treatments to meet NFMA requirements and other emerging issues has been a reduced amount of regeneration harvest. The Forest Plan predicted that the 0-10 age class of aspen would represent approximately 22% of the aspen type in 2000. Data from 2000 shows 20% of the aspen type in the 0-10 age class. There has been a reduction in aspen acres sold, which began as a trend in 1994 and continued through 2003.

The demand for Chippewa National Forest timber, especially pulpwood-sized material (both conifer and hardwoods) remained strong. Bid rates increased for pulpwood in all species product groups except spruce. The average bid rate for sawtimber- sized products continued to decrease for most conifer species, but the average bid rate for all sawtimber increased by 3.6% from 2002 values.

Table 3: Sold, Harvest, Reforestation, and TSI Accomplishments. Volume in million cubic feet (MMCF)

Activity, Effect, Practice or Output	Forest Plan Output *	FY 1992 Actual	FY 1993 Actual	FY 1994 Actual	FY 1995 Actual	FY 1996 Actual	FY 1997 Actual	FY 1998 Actual	FY 1999 Actual	FY 2000 Actual	Forest Plan Output *	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual
Timber Offered														
Total	12.3	11.7	10.8	9.5	9.1	10.0	9.4	9.9	8.8	6.7	15.5	3.9	3.6	4.0
Aspen	8.2	6.9	7.3	5.2	4.7	5.3	5.0	5.9	4.4	2.3	8.1	.7	1.7	1.5
Conifers	2.9	3.1	1.8	2.6	2.9	3.4	3.1	2.5	2.8	3.6	5.4	2.7	1.5	1.9
Hardwoods	1.2	1.7	1.7	1.7	1.5	1.3	1.3	1.5	1.6	.8	2.0	.5	.4	.6
Timber Sold														
Total	12.3	11.7	10.8	9.5	8.5	8.8	8.2	9.6	7.5	6.1	15.5	3.7	2.3	3.9
Aspen	8.2	6.9	7.3	5.2	4.5	5.0	4.5	5.7	3.8	2.2	8.1	.7	.8	2.0
Conifers	2.9	3.1	1.8	2.6	2.6	3.0	3.0	2.6	2.5	3.2	5.4	2.4	1.2	1.5
Hardwoods	1.2	1.7	1.7	1.7	1.4	0.8	0.7	1.3	1.2	.7	2.0	.6	.3	.4
Timber Cut														
Total	**	14.5	15.8	13.8	11.0	9.8	8.2	9.7	9.2	9.1	***	6.2	5.2	6.0
Aspen		9.9	10.6	8.3	6.3	6.0	4.4	5.1	4.9	4.9		3.2	2.0	2.3
Conifers		3.3	3.5	3.8	3.0	2.2	2.8	3.3	3.1	2.9		2.0	2.4	3.0
Hardwoods		1.3	1.7	1.7	1.7	1.6	1.0	1.3	1.2	1.3		1.0	.8	.7
Regen. Harvest (acres)	6,756	5,525	5,272	5,391	4,215	4,338	3,344	3,811	3,080	1,670	6736	1,575	1,249	1,491
Intermed. Harvest (acres)	1,272	1,611	1,271	1,462	1,319	2,174	2,330	1,716	2,193	3,334	1400	2,657	835	2,444
Reforestation (acres)	6,508	7,069	7,276	7,558	6,323	4,618	3,787	4,692	3,773	3,022	6736	4,172	2,430	1,887
Timber Stand Imp (acres)	1,475	2,142	1,971	1,822	2,100	1,932	1,751	1,671	3,507	5,118	1645	4,352	2,889	2,474

* Annual average Forest Plan outputs projected for the period 1986-2000. ** No objective for timber volume or acres cut. ***Annual average FP output projected for the period 2001-2002.
 MMCF= 1 million cubic feet. MMCF = 6.33 * million board feet.

Table 4: Sold, Harvest, Accomplishments. Volume in million board feet (MMBF)

Activity, Effect, Practice or Output	Forest Plan Output*	FY 1992 Actual	FY 1993 Actual	FY 1994 Actual	FY 1995 Actual	FY 1996 Actual	FY 1997 Actual	FY 1998 Actual	FY 1999 Actual	FY 2000 Actual	Forest Plan Output *	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual
Timber Offered														
Total	77.9	73.7	68.1	60.0	57.8	63.4	59.2	61.7	55.5	42.3	98.1	24.5	23.0	24.8
Aspen	51.9	43.8	46.1	32.8	29.7	33.6	31.3	36.6	27.6	14.5	51.2	4.4	10.7	9.4
Conifers	18.4	19.4	11.3	16.3	18.2	21.5	19.5	15.9	17.5	22.6	34.2	16.7	9.5	11.4
Hardwoods	7.6	10.5	10.7	10.9	9.9	8.3	8.4	9.2	10.4	5.2	12.7	3.4	2.8	4.0
Timber Sold														
Total	77.9	73.7	68.1	60.0	54.1	55.9	52.0	60.0	47.2	38.3	98.1	23.2	14.7	24.1
Aspen	51.9	43.8	46.1	32.8	28.7	31.5	29.0	35.2	24.2	14.2	51.2	4.1	5.2	12.8
Conifers	18.4	19.4	11.3	16.3	16.4	19.0	18.7	16.5	15.6	19.9	34.2	15.4	7.5	9.0
Hardwoods	7.6	10.5	10.7	10.9	9.0	5.4	4.3	8.3	7.4	4.2	12.7	3.7	2.0	2.3
Timber Cut														
Total	**	91.6	100.0	87.3	69.3	62.3	52.1	60.4	58.0	57.7	**	39.2	32.8	36.8
Aspen		62.6	67.1	52.5	39.5	38.4	27.8	31.4	31.0	31.2		20.3	12.6	14.5
Conifers		20.9	22.1	24.1	19.1	14.1	17.6	20.8	19.6	18.3		12.9	15.2	18.0
Hardwoods		8.1	10.8	10.7	10.7	9.8	6.7	8.2	7.4	8.2		6.0	5.0	4.3

* Annual average allowable sale quantity.

** No objective for cut.

C. NATIONAL FOREST MANAGEMENT ACT (NFMA) REQUIREMENTS

Land suitability for timber production and maximum size limits for harvest areas were not monitored during 2003. Those activities were conducted as part of the forest plan revision process.

With regard to regeneration units over 40 acres in size, the Sand Plain Project Environmental Assessment contained two units in excess of 40 acres. Regional Forester and public review occurred during the planning process of this project.

1. Restocking of Land

National Forest Management Act (NFMA) regulations require that cutover lands be adequately restocked within five years. Lands are certified as regenerated based upon the results of surveys one, three, or five years after artificial regeneration, or one or three years following natural regeneration activity.

a. Results:

Table 5. Acres reported as surveyed and certified by fiscal year.

	FY 2003
Stocking Surveys	4,719
Certification of Natural Regeneration	1,877
Certification of Artificial Regeneration	649
Total Acres Certified	2,526
Acres Surveyed but not Certified	2,193

b. Evaluation:

Though a trend of decline was indicated over the previous three years, the number of stocking surveys was up by approximately 1,200 acres in FY03 over FY02. Acres “Surveyed but not Certified” was up three fold over the previous year. Since reforestation generally is a need created by regeneration harvests, these numbers indicate a ramping up in the timber sale program on the Chippewa. This follows a decline in harvesting that lead to a reduction in regeneration needs in previous years. Certification of stands lags behind stocking surveys because several years of stocking surveys usually occur to insure adequate and desired stocking levels before a stand qualifies for certification. The relatively large increase in “Acres Surveyed but not Certified” indicates an increase in more recent reforestation efforts following harvest.

2. Insects & Diseases

a. Gypsy Moth

In 2003, our cooperators, USDA-APHIS set out 519 Gypsy Moth traps within the Chippewa National Forest and one single male moth was recovered. In 2004, the Minnesota Department of Agriculture will delimit trap (high density traps) around the single find from the previous year (approximately 20 total traps). The intent of delimit trapping is not necessarily to “trap out” the insect. Rather, it’s to determine the extent of a possible infestation. Male moth recoveries alone do not necessarily indicate an

infestation. It takes several years of trapping, and eggmass surveys to determine if indeed a population has become established. It is not uncommon to find a single male moth in a detection trap. More often than not these traps will come up negative the following year.

b. Jack Pine Budworm

Jack pine budworm has been moving through the range of Jack pine in Minnesota for the past few years. Up until 2003, the Chippewa National Forest was unaffected. The upswing in populations is a natural cycle of this native insect. Over the past two years defoliation of Jack pine by this budworm has moved through Hubbard and Beltrami Counties. In 2003, it reached the western edge of the Chippewa National Forest. Concentrated around the Pike Bay area of Cass Lake, the jack pine budworm (JPBW) has affected approximately 275 acres. This will likely spread through more of the Forest in 2004, and an interagency strategy is now being planned to cope with JPBW.

c. Forest Tent Caterpillar

Levels of forest tent caterpillars were high during 2001 and 2002. Affected acres dropped in 2003.

d. Other

Other insect pests seem to be at endemic levels with no large scale outbreaks.

D. WILDLIFE AND FISH

1. Habitat Improvement Accomplishments

Wildlife habitat improvement, including improvements for threatened and endangered species, consists of structural and non-structural habitat enhancement or restoration. Structural improvements include nesting islands, platforms, and boxes, and are expressed as the number of structures placed in suitable habitat that is currently lacking these particular features. Non-structural improvements include seeding, planting, deer habitat improvement, permanent opening construction, impoundment draw down, and prescribed burning, and are expressed as acres treated to enhance or restore current habitat conditions for a particular group of species. Lake and stream restoration and enhancements include structural and non-structural habitat improvements that address environmental features limiting the productive capability of lake and stream fish populations (spawning riffles, additions of large woody debris, riparian planting, restoration of aquatic vegetation, etc.). Table 6 displays annual accomplishments for wildlife and fish habitat restored or enhanced since 1986.

a. Results:

The 1986 Forest Plan for the Chippewa National Forest projected an annual accomplishment for the time period of 1991-2000 of 889 acres of non-structural wildlife habitat improvement. For the same time period, the Forest Plan also projected an annual accomplishment of 417 structural wildlife habitat improvements, as well as 69 fish habitat improvement structures.

For 2003, the Chippewa produced less than was projected in the 1986 Forest Plan for both wildlife and fish habitat acre and structural improvements (Table 6). In non-structural wildlife improvements, 397 acres were accomplished. In non-structural lake and stream improvements, 14 acres and 13 miles were accomplished respectively. Beginning in 1995, the Forest's Management Attainment Report asked for fish habitat restored or enhanced to be expressed as acres and miles of improvement and not structures,

Table 6: Wildlife and Fish Habitat Improvements

Year	WILDLIFE		FISH	
	Non-Structural Improvements (Acres)	Structural Improvements (Structures)	Lake Improvements (Acres)	Stream Improvements (Miles)
1986-1991	9495	3203	486 ac; 1174 structures	not reported
1992	2245	462	2 ac; 26 structures	not reported
1993	2963	623	0 ac; 6 structures	not reported
1994	2404	181	2 ac; 100 structures	not reported
1995	942	582	129	3
1996	3716	671	95	2
1997	100	108	103	3
1998	190	0	13	5
1999	285	0	12	5
2000	1176	619	14	2
2001	2661	6	209	2
2002	1465	not reported	57	2
2003	397	not reported	14	13

and more recently, the wildlife program has stopped tracking structures. In response to this change in direction, an acreage figure for habitat restored or enhanced is now assigned to the placement of a habitat structure; for example, a loon nesting structure is now reported in acres of wildlife habitat enhanced.

2. Wildlife Population Monitoring - MIS

This category monitors and evaluates population trends of designated management indicator species to analyze the potential effects of management practices on wildlife habitats and populations. Management indicator species (MIS) are defined as species monitored over time to assess the effects of management activities on their populations and the populations of other species with similar habitat requirements (Forest Service Manual 2620.5). The rationale underlying the MIS concept is that by managing for and conserving the habitats in which MIS occur, other species that depend on these habitats would also be provided for. The Chippewa National Forest has identified fourteen MIS, each representing different wildlife or fish communities within the Forest. National Forest Management Act Regulations (CFR 36, part 219.19, paragraph a-6) state "Population trends of management indicator species will be monitored and relationships to habitat changes determined."

MIS were designated in the Chippewa National Forest Land and Resource Management Plan (1986, page IV-65). Lowell H. Suring and John E. Mathisen (1983) selected the MIS for monitoring on the Chippewa National Forest. They included five categories for representation:

- (1) Endangered, threatened, or sensitive species;
- (2) Species with special habitat needs that may be influenced significantly by planned management programs;
- (3) Species commonly hunted, fished or trapped;
- (4) Non-game species of special interest
- (5) Species whose population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

Table 7: Management Indicator Species on the Chippewa National Forest, with reasons selected (according to Suring and Mathisen, 1983) and the preferred habitat for each species.

Common name	Reason for selection	Preferred habitat
Gray wolf	Federally threatened	Broad spectrum of habitats with abundant ungulate prey
White-tailed deer	Represents shrub-sapling communities and is an important game species	Forests, swamps and open brushy areas
Bald eagle	Federally threatened	Large trees adjacent to fish bearing lakes and streams
American woodcock	Represents permanent opening community	Young aspen and hardwood stands, alder, and openings containing brush on moist soils
Barred owl	Represents lowland deciduous communities	Mature interior, hardwood and mixed deciduous-coniferous forests bordering lakes and wetlands
Black-backed woodpecker	Represents mixed upland communities and also is a Sensitive species.	Mature coniferous forests which include dead and dying tamarack / spruce bogs, white cedar infested with wood boring beetle larvae
Blackburnian warbler	Represents coniferous upland communities.	Mature lowland and upland coniferous forests, especially jack pine
Common loon	Represents aquatic communities	Clear lakes with undisturbed shorelines and islands for nesting
Northern parula	Represents lowland conifer communities	Mature interior, contiguous coniferous or mixed forests near water
Pileated woodpecker	Represents old growth deciduous upland communities and secondary cavity nesters	Mature, upland deciduous, mixed and coniferous forests which are dense canopied and contiguous
Pine warbler	Represents coniferous upland communities.	Mature white, red and jack pine forests, particularly white pine
Ring-necked duck	Represents wetland communities	Marshes, wooded ponds, bottomland lakes and open areas in swamps
Ruffed grouse	Represent deciduous upland communities and is an important game species	Early successional mixed and deciduous forests, particularly aspen and birch
Walleye	Represents aquatic communities and is an important game species	Large, clean and cold or moderately warm lakes and rivers

Two species are listed as both threatened and MIS. One species is listed as sensitive and MIS. The great gray owl, originally designated a MIS in the Chippewa National Forest Land Management Plan, was replaced by the northern parula in Amendment #6 in 1989. Walleye was designated as a MIS by the Forest Plan, but was not discussed by Suring and Mathisen (1983). Table 7 lists the reason for selection for each Management Indicator Species. Since 1983, more has been learned about the preferred habitat for some of the species. In particular, the black-backed woodpecker and northern parula are now known to prefer habitats somewhat different than the habitats they were proposed to indicate. The preferred habitat for all species is also listed in Table 7.

Gray wolf and bald eagle were selected because of their status as federally threatened. Species federally listed since 1983 (piping plover and Canada lynx) have not been designated as MIS.

Monitoring of management indicator species is conducted by the Chippewa National Forest, the

Table 8: Management Indicator Species Monitoring

Management Indicator Species	Unit of Measure	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY96	FY97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
American woodcock ¹	Singing males per route	4	3	5.1	5.4	5.7	4.0	2.8	4.2	N/S	2.6	3.8	3.9	5.7	5.1	3.6	3.0
Bald eagle ¹	Active breeding pairs	135	144	154	160	175	186	88	174	189	161	163	138	139	132	153	160
	Successful breeding pairs	91	98	101	99	101	108	119	97	97	104	ND	ND	93	107	87	86
	Young per active nest	1.08	1.13	1.03	1.00	0.80	0.92	0.99	0.93	0.76	.96	ND	ND	0.94	1.02	0.85	1.3
Barred owl ²	Owls per stop	0.21	0.40	0.50	0.40	0.30	0.40	0.30	0.50	N/S	0.26	N/S	0.36	N/S	0.48	N/S	.64
Common loon ²	Active breeding pairs per lake	0.83	0.94	0.78	0.74	1.15	0.67	0.83	0.80	N/S	ND	N/S	<i>b</i>	N/A	N/A	N/A	N/S
	Adults/100 acres lake surface							3.6	3.6	3.8	3.5	3.4	3.2	N/S	3.4	N/S	N/S
	Average brood size at fledging	0.66	0.41	0.61	0.38	0.49	0.33	0.30	0.31	N/S	ND	N/S	0.43	N/S	0.48	N/S	N/S
Northern parula ³	No. of pairs			30182	<i>a</i> 6332	3048	4815	4500	ND	ND	3800	N/S	N/S	<i>c</i>	<i>c</i>	<i>c</i>	N/S
Pileated woodpecker ²	Calls per stop	0.32	0.46	0.42	0.37	0.24	0.22	0.41	0.32	N/S	0.63	N/S	.23	N/S	0.8	N/S	.88
Ring-necked duck ²	Ducklings/acre of wetland	0.23	0.19	0.20	0.16	0.15	0.12	0.16	ND	N/S	ND	N/S	N/D	N/S	N/D	N/S	N/S
	Pairs per acre	0.08	0.06	0.07	0.05	0.05	0.04	0.05		N/S	ND	N/S	N/D	N/S	N/D	N/S	N/S
Ruffed grouse ¹	Drums/stops	1.6	2.2	1.6	1.5	0.8	0.6	0.7	0.7	N/S	2.0	1.4	1.3	1.1	0.7	0.8	.54
Blackburnian warbler ³	No. of pairs	N/S	20,311	25,407	<i>a</i> 7,693	5,758	4,381	3,639	ND	ND	9,400	N/S	N/S	<i>c</i>	<i>c</i>	<i>c</i>	N/S
Pine warbler ³	No. of pairs	N/S	34,751	42,616	<i>a</i> 3,139	3,699	5,193	4,207	ND	ND	2,830	N/S	N/S	<i>c</i>	<i>c</i>	<i>c</i>	N/S
Gray wolf ²	No. of wolves	N/S	N/S		80 to 90	100	N/S	N/S	N/S	N/S	N/S	N/S	100 +	N/S	N/S	N/S	N/S
White-tailed deer ¹	Deer per sq.mi.	12.4	12.2	14.7	16.3	18.1	17.8	18.6	18.0	ND	11.0	10.2	11.9	15.6	15.2	15.8	15.5
Walleye ⁵	Pounds/acre	N/S	ND	ND	ND	ND	ND	ND	ND	ND	ND	<i>c</i>	<i>c</i>	N/S	N/S	N/S	N/S

a In 1991, the method used for monitoring changed, so were unable to compare with previous years.

b The 1999 Minnesota Loon Monitoring Program began displaying Loon Abundance in Adult Loons per 100 acres. Previous year data was converted in order to make comparisons.

c Population trends presented in graph form rather than breeding pairs or pounds/acre.

d N/S = Not Scheduled. ND = No Data. Monitoring Frequency: ¹Monitored Annually ²Monitored every 2 years ³Monitored every 3 years ⁵Monitored every 5 years

Minnesota Department of Natural Resources (MN DNR), and the Natural Resources Research Institute (NRRI). The NRRI data is available from Lind et al. (2003) and the NRRI web page. Many of the MIS birds are also regionally and nationally monitored by the National Breeding Bird Survey (BBS).

Results:

Population targets or base line populations were established in the Forest Plan for breeding bald eagles (150 pair), gray wolves (40-50 individuals), and white-tailed deer (25-30 per square mile).

3. Existing Forest-wide Wildlife Habitat Conditions:

The implementation of the 1986 Forest Plan has resulted in an existing forested landscape that has considerable implications to wildlife habitats and to wildlife populations native to the Chippewa National Forest (CNF). Because a large majority of the timber harvesting has occurred on upland landforms, the effects to wildlife populations are especially evident in those species that are associated with upland forested habitats. For upland wildlife, the 1986 Forest Plan placed primary emphasis on providing habitat for large populations of game species (white-tailed deer, ruffed grouse, and American woodcock). These habitat conditions were to be provided through the regeneration of upland forest types, especially aspen and jack pine (short rotation conifer), by way of the clearcutting harvest method. These two forest types occupy over 50% of the upland area on the CNF, and a relatively large proportion of these two types are currently less than 20 years old (see Table 2).

Implementation of the 1986 Forest Plan over the past 18 years has resulted in an abundance of habitats favorable to wildlife species associated with early successional upland forest conditions. Wildlife species, such as white-tailed deer, ruffed grouse, chestnut-sided warbler, and others, associated with young forest habitat conditions have maintained relatively high population levels over the past 10-15 years of monitoring.

However, the amount, size, and spatial distribution of early successional forest within the CNF has also resulted in landscape conditions that are not favorable to a wide variety of wildlife species. The intensity of upland forest timber harvests over the past 15 years has caused:

- an increase in forest edge,
- an increase in habitat fragmentation,
- a decrease in mature and older forest conditions,
- a decrease in large mature forest patches, and
- a decrease in forest interior conditions.

Additionally, the emphasis on harvesting short rotation conifer and aspen has reduced the acreage of upland forest types in a vegetation growth stage capable of providing large amounts of snags and downed woody material at concentrated levels. The current age class imbalances in the short rotation conifer and aspen create bottlenecks in the habitat turnover rates needed to sustain habitat conditions and wildlife communities associated with these forest types over time. These current landscape conditions increase the concern for many wildlife species which are associated with larger patches of mature and older upland forest habitats, such as the northern goshawk, red-shouldered hawk, black-throated blue warbler, black-backed woodpecker, Blackburnian warbler, and others.

American woodcock: The numbers of singing males per route in 2003 falls within the range observed from 1988-2002 and are similar to numbers observed since 1997. When compared to the number of singing males per route in the Central Region of the American woodcock range in 2001 (Dexter, 2002), the 3.0 singing males per route on the Chippewa still exceeds the number for the Central Region

(approximately 1.9-2.0 singing males per route). Thus, woodcock population levels on the Chippewa appear to be higher than those found throughout the Central Region. The more than ten years of monitoring data collected on this species does not indicate a downward population trend on the Chippewa National Forest.

Bald eagle: Considering 2003 data, bald eagle populations have remained relatively constant across the Chippewa National Forest. The number of active breeding pairs recorded in 2003 is low in comparison to a 15 year average. However, productivity for this year is the highest recorded during this 15 year period. Increasing competition among breeding pairs at higher nesting densities is thought to be the primary factor in breeding success declines. Nest productivity in 2003 appears to run counter to trends since 1994.

Barred owls: Based upon the number of barred owls recorded per stop along established survey routes in 2003 (0.64 owls per stop), owl population numbers appear to be above the range of those recorded over the past 10-15 years. According to the data collected over that time period, barred owl numbers appear to fluctuate up and down from year to year without drastic variations. No definite trend in barred owl populations can be established at this time.

Common loon: The Minnesota Department of Natural Resources' Loon Monitoring Program provides breeding information for loons in three areas of northern Minnesota. In 2001, the adults/100 acres of lake surface and the average brood size at fledging, for Itasca County (near Marcell, MN), were not significantly different from that collected for that area in previous years.

Pileated woodpecker: Based upon the number of calls per stop, the pileated woodpecker numbers appear to continue to increase on the Chippewa National Forest. The calls per stop recorded in 2003 are the highest recorded during the past 10-15 years.

Ruffed grouse: The mean number of drumming grouse on the Chippewa in 2003 (0.5 drums per stop) is the lowest recorded number on the Chippewa during the period of 1988-2003. Other recent surveys (2001, 2002) are similar to those of approximately 10 years ago. The ruffed grouse population on the Chippewa National Forest appears to have remained relatively stable over the past 10-15 years, and continues to fluctuate in the cyclic manner characteristic of their population dynamics.

Forest Songbirds: The Natural Resources Research Institute, through the Breeding Bird Monitoring in Great Lakes National Forests project, has been monitoring breeding birds on the Chippewa National Forest since 1991. The Blackburnian warbler, northern parula, and pine warbler population levels on the Chippewa are monitored through this project. These species are required to be monitored every three years and are not reported for 2003. For past years, none of these three warbler species show a statistically significant decrease in population trend. Although the northern parula and pine warbler show fairly stable population numbers over this monitoring period, the Blackburnian warbler shows a slight but relatively steady decline over this same time period.

Gray wolf: In recent years, there has been a gradual, long-term increase in wolves in Minnesota. The Chippewa National Forest contributed observation information to the 1997-1998 wolf survey conducted for the state of Minnesota. This most recent assessment estimates 2,450 wolves ranging over 33,970 square miles of the state. This represents a 50% increase in wolf numbers and a 48% increase in contiguous pack range from the 1988-89 estimates. The area occupied by wolves within the contiguous pack range increased by 45% over that estimated in the 1988-89 survey. The calculated annual rate of wolf population increase from 1988-89 to 1997-98 was 1.045. This is nearly identical to the 1.04

calculated by Fuller et al for the period of 1970-1989.

The Minnesota Department of Natural Resources plans on conducting another formal statewide wolf survey during the winter of 2003-2004. As with similar surveys conducted in 1979, 1988, and 1998, this survey is expected to obtain data on wolf distribution and abundance in Minnesota. Results of this survey will be included in the next Chippewa National Forest Monitoring and Evaluation report.

References

- Lind, Jim, Nick Danz, Malcolm T. Jones, JoAnn M. Hanowksi, and Gerald J. Niemi. 2003. 2002 Annual Update Report: Breeding bird monitoring in Great Lakes National Forests: 1991-2002. Natural Resources Research Institute, Technical Report: NRRI/TR-2002/24. Duluth, Minnesota. (http://www.nrri.umn.edu/mnbirds/spp_trends.htm)
- Dexter, M.H., editor. 2002. Status of wildlife populations, fall 2002. Unpub. Rep., Division of Wildlife, Minn. Dept. Nat. Res., St. Paul, Minnesota. 176pp.
- Sauer, J. R., J. E. Hines, I. Thomas, J. Fallon, and G. Gough. 1999. The North American Breeding Bird Survey, Results and Analysis 1966 - 1998. Version 98.1, USGS Patuxent Wildlife Research Center, Laurel, MD (<http://www.mbr.nbs.gov/bbs/bbs.html>)
- Suring, L.H. and J.E. Mathisen. 1983. Selection of Management Indicator Species on the Chippewa National Forest. Chippewa National Forest. Cass Lake, Minnesota.

E. GOBLIN FERN (*BOTRYCHIUM MORMO*)

Goblin fern, *Botrychium Mormo*, is a small species of moonwort found in rich hardwood forests in the northern portions of Minnesota. It is a Regional Forester Sensitive Species for Region 9. The "Conservation Approach for Goblin fern, *Botrychium Mormo* W.H.Wagoner" was completed December 2001.

One of the information needs identified for the Goblin Fern was to investigate the response of this species to changes in overstory vegetation and winter logging as would occur in some typical forest management practices. One of the known colonies of goblin fern on the Forest was chosen. The site selected for this study is south of Lower Sucker Lake (Township 144 North, Range 30 West, Section 3), where goblin fern colonies occur on either side of Forest Road 2135. The colony on the west side of the road (14 acres) was chosen as a control and the east side (17 acres) was chosen for treatment of a typical hardwood management practice.

During 1995, both sites were extensively searched for goblin ferns and each plant location was marked. Plot data was taken in 1995 through 1999. Currently, treatment is scheduled for winter 2004-2005. Post treatment plot data will be collected for a number of years, depending on the extent of the response and confidence in the results.

F. RECREATION

1. Results:

The 1986 Chippewa National Forest Land Resource Management Plan identifies four recreation activities and outputs for annual monitoring and evaluation. They are:

1. Hunter Walking Trails – Miles (annually)
2. Trails:
 - a. Non-motorized Trails – Miles (annually)
 - b. Motorized Trails – Miles (annually)
3. Boat Access:
 - a. Drive-In – Number (annually)
 - b. Carry-In – Number (annually)
4. Recreation Use – RVDs (annually)

During FY04, the miles of hunter walking, and motorized trails have remained constant at 83 and 20 miles respectively. The Forest maintained 167 miles of trail, and improved 9 miles to standard last fiscal year. Currently, there are 248 carry-in boat accesses, and 107 drive-in accesses on the Forest. During the monitoring period, the Plughat Boat Access was improved by increasing the parking capacity of this back-in access. No other boat accesses were improved.

Since the 1986 CNF LRMP was developed, the method for quantifying recreation use has changed dramatically. Historically, recreational use was counted in Recreational Visitor Days (RVDs). An RVD is defined as one person recreating for a 12-hour block of time. Currently the standard of measurement is a national forest visit (entry of one person for an unspecified period of time into the National Forest site or area for recreation activities). Existing Forest Plans and other agency needs mandate visitor use monitoring. Thus, the National Visitation Use Monitoring Program (NVUM) was developed to provide statistically reliable estimates of visitor use to assist with federal land management planning decisions. The survey also provides important information for Congress and external customers including states, private industry, and academia.

In addition to estimating the numbers of visitors, the NVUM program obtained descriptive information about National Forest visitors. This information includes visitor age, race, activity participation, outdoor recreation expenditure profiles, and length of stay. Additionally, information about the visitor's satisfaction with Forest Service facilities and services was collected. NVUM data also help to answer monitoring elements in the USDA Forest Service Strategic Plan (2000 Revision) and the international monitoring plan 2003 Nations Report on Sustainable Forest Management. Most elements have a fiscal year 2006 target for improvement. The NVUM study will be conducted again on the CNF in 2006. Results of the NVUM on the Chippewa for FY 01 were 2.3 million recreation visits for 6.1 million RVDs. The top three recreation activities were snowmobiling, hunting, and fishing and visitor satisfaction met or exceeded expectations. A table summarizing visitor participation and primary activity on the CNF is included below. A further breakdown and activity analysis can be found in the National Visitor Use Monitoring Results (Kocis, et al., May 2002).

2. Evaluation:

Recreational use of the Chippewa National Forest continues to grow as private lands in north central Minnesota become increasingly more developed, the state population expands, and the northern lakes area becomes ever more popular as a year-around destination. Visitors seek out public land in which to pursue a diverse range of outdoor recreational activities. National trends indicate that winter, water based, and developed land activities will in general grow faster than the population (Cordell's Projection of Outdoor Recreation Participation to 2050).

Currently, the Chippewa National Forest is providing an adequate range of hunter walking, and other non-motorized trail opportunities to meet current demand. With the completion of the Migizi paved bike

Table 9: Chippewa NF activity participation and primary activity.

Activity	Percent participation	Percent who said it was their primary activity
Camping in developed sites (family or group)	8.7	1.1
Primitive camping	0.5	0.0
Backpacking, camping in unroaded areas	0.8	0.3
Resorts, cabins and other accommodations on Forest Service managed lands (private or Forest Service run)	23.0	4.8
Picnicking and family day gatherings in developed sites (family or group)	12.2	1.8
Viewing wildlife, birds, fish, etc on national forest system lands	53.6	0.1
Viewing natural features such as scenery, flowers, etc on national forest system lands	45.1	5.4
Visiting historic and prehistoric sites/area	8.5	0.6
Visiting a nature center, nature trail or visitor information services	9.2	0.1
Nature Study	5.1	0.4
General/other- relaxing, hanging out, escaping noise and heat, etc,	74.3	7.0
Fishing- all types	33.4	24.4
Hunting- all types	20.7	19.0
Off-highway vehicle travel (4-wheelers, dirt bikes, etc)	8.4	0.3
Driving for pleasure on roads	27.8	1.5
Snowmobile travel	29.0	27.5
Motorized water travel (boats, ski sleds, etc)	20.9	0.1
Other motorized land/air activities (plane, other)	0.4	0.0
Hiking or walking	30.7	6.5
Horseback riding	1.1	0.7
Bicycling, including mountain bikes	3.6	1.3
Non-motorized water travel (canoe, raft, etc.)	4.9	0.5
Downhill skiing or snowboarding	0.1	0.1
Cross-country skiing, snow shoeing	21.7	0.8
Other non-motorized activities (swimming, games and sports)	10.6	0.8
Gathering mushrooms, berries, firewood, or other natural products	7.0	0.8

trail (phases 1-3), the forest has shifted its emphasis from construction to reconstruction of existing trails. Efforts will now be placed on improving the trail user's experience, while protecting natural resources, mainly water quality/wetlands. The exception to this is the last phase of the Migizi Trail (phase 4) that will connect the Norway Beach Recreation Area with the Great River Road National Scenic Byway. This phase will be implemented as funding opportunities and partners are secured.

Water access is one of the key recreation issues in the CNF forest plan revision. Inventories, assessments and collaboration with state and county recreation managers have occurred over the past two years. The new Forest Plan provides goals, objectives, standards, and guidelines related to water access opportunities and management. The Plan limits future construction of water access developments to five sites over the next decade, and permit maintenance of existing structures at current levels.

Motorized use continues to generate substantial interest, and concern, by both Forest managers and the public. The Chief of the Forest Service has identified unmanaged recreation, specifically OHV use as

one of the top four threats to National Forests. OHV's riding opportunities was one of the key recreation issues addressed in the new forest plan. The new Forest Plan has shifted the Chippewa's OHV policy from an "open unless posted close", to a "closed unless posted open" philosophy. The Plan provides for the potential addition of up to 90 miles of new OHV trail, and up to 100 miles of snowmobile trail during the planning period. The Forest will begin evaluating roads and trails for designating as open to OHV use over the next 12 - 18 months.

Peak use on the Chippewa occurs at fishing season opener, Minnesota Education Association (MEA) Convention weekend, opening of deer hunting season, summer holidays, and prime snowmobiling season. Given the local and national trends in outdoor recreation the Chippewa National Forest is well positioned to help meet future recreation demands in trails, water access and general developed and dispersed use.

G. HERITAGE RESOURCES

1. Identification and Protection:

Compliance with various laws and regulations requires that the Chippewa National Forest identify and manage heritage resources (usually archeological and historic sites) which may potentially be eligible for the National Register of Historic Places. This must be accomplished prior to any activity which may damage or destroy the site. The Forest conducts reconnaissance field surveys to search for heritage resources in all proposed project areas which might involve earth disturbance. Projects which typically require surveys include timber sales, wildlife openings, utilities installations, gravel pit development and expansions, land exchanges, special use permit activities, prescribed burns, and recreation facility development and maintenance. Surveys for the heritage program are driven by project work across the forest. Funding is not available to do surveys outside of project areas.

A total of 15,247 acres were surveyed in FY 2003 for proposed undertakings. Twenty nine new archeological sites were identified. There were no adverse effects to historic properties. Working with Leech Lake Reservation, the Forest has initiated a program to identify and record traditional resource areas. The information gathered will be used in project planning, assessment, and implementation as it becomes available.

Numerous public interpretation and education activities were conducted by heritage staff. These included presentations to local schools, tourists, and community groups, as well as formal training sessions in partnership with other agencies. Thirty seven volunteers contributed 1670 hours in evaluation of the Sucker Lakes archeological site during Passport in Time in FY 2003. At the standard GS-5 archeological technician pay rate of \$12.31 per hour, the value of that time is \$20,558.

2. Evaluation:

Eight archeological sites were found eligible to be listed on the National Register of Historic Places with concurrence of the State and Leech Lake Tribal Historic Preservation Offices. Fifteen archeological sites were found to be ineligible for listing on the National Register of Historic Places.

Overall, the Heritage Resource program is meeting the intent of the Forest Plan.

H. INTERPRETATION OF NATURAL AND HISTORIC AREAS

Natural and Historic Areas are management areas that are set up to preserve and interpret areas on the Forest which possess unique historic, biotic, aquatic, or geologic values.

All of the unique areas on the Chippewa National Forest are monitored and/or interpreted to some degree, though it is difficult to monitor visitor use in some of the lesser-known sites. In the past, we have worked with the districts to put together numbers for visitation at these sites. The Public Affairs office in recent years has tried to put explanations on why numbers are up or down at a particular site. In the 2002 monitoring report, we began putting down known information regarding each site that helped to explain the number increases or decreases from previous years. We continue that reporting method for 2003.

In 2003, we began planning for interpretive projects focusing on historic sites, gearing up for the 2005 Centennial. Increases in numbers for the 2003 monitoring report generally reflect the increased interpretation on site, the additional information available about the historic sites, or increased programming at Visitor Centers regarding natural areas.

Elmwood Island—Located 3 miles south of Northhome, Elmwood Island is almost entirely surrounded by private land, with the exception of two small state parcels of shoreline. The boat landing is located on the Northwest corner of the lake. There is one resort on the lake, so use may be highest among the resort guests and private cabin owners. It is rare that Forest visitors request information for the Island. The Island Lake Resort owners said quite a few people do visit the site in the summer, but they did not have numbers. They did report most recreation use to be hiking and picnicking.

Forest Supervisor's Office—Located in the city of Cass Lake, the Forest Supervisor's Office is visited most often by people obtaining various land use permits (fire, fuelwood, Christmas Trees) and by other agencies/community leaders coming in for meetings. In 2003, we led four groups on tours and received one group of kindergartners from the Cass Lake School (approx. 150 students). The Cass Lake Miracle Group and Cass Lake Chamber utilized the meeting room space as well.

Gilfillan Area--This site, approximately 10 miles south of Blackduck, is little known and rarely visited. As an orchid bog, it may be the more enthused botanist who ventures out into this remote area. Three visitor inquiries at the Supervisor's Office occurred in 2003.

Lost 40—The Lost 40 does attract attention from both the casual Forest sight-seer as well as those who are very interested in old growth forest and forest management. In 2003, the St. Paul Research Station (State and Private Forestry) created interpretive panels to discuss Old Growth forests. This added interpretation and marketing of the State-owned forest bordering the National Forest land increased use on both sides. Blackduck district SCSEP employees noted that they were refilling the Lost 40 brochure rack at the site on every weekly visit. They also noted people on site during many of their visits. The Blackduck and Deer River districts, both Visitor Centers, and the Supervisor's Office receive many requests for information on the Lost 40.

Rabideau Civilian Conservation Corp (CCC) Camp—Visitation at the Camp has increased over the past summer with the help of volunteers working at the site. In 2003, Mary Nipp, a SCSEP employee out of the Blackduck Ranger Station, led tours to Forest visitors and community groups. Visitors were also noted as "drive-thrus"; estimates are approximately 400 people per summer. Each summer, the Norway Beach naturalist schedules a one car caravan to visit the site in July. Five people joined the caravan in 2003. The Blackduck Ranger District invites the area schools to Rabideau every spring for a day of natural resource and historic presentations. (Approximately 100 students visited the site.) Most efforts are being put into bringing the public to Rabideau and increasing their awareness of CCC history and projects on the Forest.

Ten Section Area—Interpretation efforts focused on the 100-year Anniversary of the Minnesota Forest Reserve and have brought renewed attention to the Ten Section area. Visitors tend to come in to the Norway Beach Visitor Center with information requests and looking for ideas on how to best take in the Ten Section Area. Visitation statistics from the Norway Beach Visitor Center showed approximately 6400 visitors in 2003. Campground numbers in 2003 were strong, increasing from previous years. Improvements continue to be made with money collected through the recreation fee demo program.

Pennington Bog—The DNR Non-Game offices in St. Paul and Bemidji issued permits to 35 individuals in 2003. (There were 36 permits issued in 2002.) The state tracks permits and allows just 5 permits per week to be issued, with 5 people allowed per permit.

Cut Foot Sioux Ranger Station---The Cut Foot Sioux Visitor Center naturalist led two tours to the site in 2003, with approximately 10 people per tour. Visitors are also directed to the site that is now interpreted both at the Visitor Center and on-site. Campground hosts and Visitor Center volunteers tend the Heritage garden. The tie to the early Forest history definitely draws visitors to the site.

Miller Lake--- Besides the Unique area flyer, there is very little interpretation. There is some information in the “Sharing our Secrets” brochure, but this does not seem to draw any great numbers. There may be some local traffic to the area, but only minimal requests are reported by the Marcell office.

Webster Lake Bog—Campers drawn to the seclusion of the Webster Lake campground are the most likely group to take the bog walk. Information requests are almost always attached to a desire for camping in quieter areas with hiking opportunities. The area also sees an increase in visitation during the hunting season, as grouse hunters use the Webster Lake Hunter-Walking Trails.

I. ROADS

Table 10: Road Construction and Existing Miles

Activity, Effect, Practice or Output	Unit of Measure (Annual)	Forest Plan	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003
Construction	Miles	19.25	.8	2.4	0.0	7.7	3.3	0.0	2.0	0.8	0.0
Collector	Miles	0.25	0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Local	Miles	19.0	.8	2.4	0.0	7.7	3.2	0.0	2.0	0.8	0.0
Open - Local Roads	Miles	* 1,562.0	1,441.8	1,443.6	1,372.0	1,379.9	1,380	1,678	1,752	1,753	1,581
Closed - Local Roads	Miles	* 162.0	244.9	245.5	429.0	429.0	429.0	333	323	324	277

* This value is the total that would exist in the year 2000.

1. Results

No new collector or local roads were constructed. Any timber roads constructed were temporary roads that were to be obliterated or decommissioned after use.

2. Evaluation

Open Local Road mileage was determined using the Operational Maintenance Level (OML) 2 road

mileage total as reported in the FY2003 Annual Roads Accomplishment Report. OML 2 roads are local roads, managed as open to high clearance motor vehicles.

Closed Local Road mileage was determined using Operational Maintenance Level (OML) 1 road mileage total as reported in the FY2003 Annual Roads Accomplishment Report. OML 1 roads are local roads, managed as closed to motor vehicles.

Temporary Roads are roads that are authorized by contract, permit, lease or other written authorization, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management. Temporary road totals are not included in the above mileage totals.

The mileage changes in 2003 are due to continued database inventory updates that reflect current conditions as determined from field observations.

J. SOIL

1. Timber Sale Monitoring

Implementation of the Forest Plan has the potential to affect forest soils in a variety of ways. Normally several timber sales on National Forest lands are monitored as part of the Minnesota Forest Resources Council (MFRC) efforts to monitor the effectiveness of their Forest Management and Timber Harvesting Guidelines. The U.S Forest Service (Chippewa and Superior National Forests) is a member of the council. In 2003, the Forest Resources Council decided to take a break from statewide monitoring for several reasons, including guideline revision. The council is planning to monitor sites in 2004.

Except for the last month of 2003, there was no soil scientist employed with the Chippewa National Forest; hence, there was no soil monitoring conducted for that year.

2. Long-term Soil Productivity Study (LTSP)

As part of a national long-term soil productivity study, soil porosity and organic matter are being experimentally manipulated on large plots to determine the impacts of such manipulation on growth and species diversity of aspen stands on the Chippewa National Forest. Sampling five years after treatments occurred on the Ottawa National Forest in upper Michigan in 1996 and on the Huron-Manistee, lower Michigan, in 1997. Research was done in two areas on the Chippewa National Forest. The first is on the Marcell Experimental Forest in the Marcell Moraine Land Type Association (LTA) and it was started in 1991. The second study area is on the Pike Bay Experimental Forest in the Guthrie Till Plain LTA. That treatment began in 1993.

In 2003, soil cores were taken for bulk density, penetrometer readings were performed, and nutrient analysis was done on the foliage at the Pike Bay Experimental Forest sites.

a. Results:

Preliminary findings on test plots indicate that disturbance treatments decreased 5-year growth of potential crop trees and delayed early stand development. Four test plots were prepared to determine the effects of soil compaction and organic matter removal on soil properties and growth of aspen suckers; associated species and herbaceous vegetation on stand development. The study involved winter harvest of 70-year-old aspen growing on loamy sand with site index of 65. The following treatments were applied to the sites:

- 1) whole tree harvest (trees lifted off the site with little or no ground disturbance from machinery)

- 2) soil compaction
- 3) forest floor removal and
- 4) soil compaction and forest floor removal.

After five growing seasons, numbers of suckers was extremely limited on the soil compaction areas. Mean diameter and height of regeneration was greatest on the whole tree harvest area. The treatment areas of soil compaction, forest floor removal or both all resulted in reduced biomass of foliage, stems, and total suckers to about one half of that produced on the whole tree harvest treatment. And, after five years, there was an abundance of saplings (>1 inch dbh) on the whole tree harvest area but few on the other treatment areas. Data collection (soil bulk density, soil strength, plant nutrient analysis and regeneration by species) continued in years seven and ten, but have not been compiled.

b. Evaluation:

The data suggests that managers should plan activities to minimize the area covered by machine traffic and to avoid traffic in the spring after suckers have begun to emerge. Data collected still needs to be summarized and conclusions and recommendations made by the research group. North Central Forest Experiment Station plans to hire a post-doctoral research scientist to summarize the data gathered for 10 years.

3. Big Bud Timber Harvest Monitoring Project

In addition to the LTSP study, the Big Bud timber sale in the Pike Bay Experimental Forest on the Guthrie Till Plain was selected to further study the effects of timber harvesting on soil productivity. The study was conducted by the North Central Forest Experiment Station in Grand Rapids. Soil strength, soil bulk density, site disturbance and the regeneration of vegetation was sampled in 1998 and 1999. Due to budget concerns data collections that were planned for 2003 did not occur.

4. Exotic Earthworms

For the past several years, the Chippewa National Forest has been monitoring the effects of exotic earthworm (European in origin) invasion on the soil resource. Drastic changes in the distribution of soil organic matter (litter and humus layers) caused by the invasion of earthworms has been documented along with shifts in the animal and plant community species composition. Cindy Hale, a PhD student from the University of Minnesota, has been responsible for much of the research on earthworm impacts. Three sites on Ottertail Point (Leech Lake) and one site on Blackduck Point (Leech Lake) were studied.

Deer exclosures were built on Ottertail Point to study the combined effect of deer and earthworm impacts. The deer exclosure study is being conducted by Andy Holdsworth, another graduate student from the University of Minnesota and is still ongoing.

a. Results:

The last year for fieldwork was 2001. During that time there were fall and spring vegetation surveys conducted and the upper soil horizons were examined. Earthworms were surveyed in the fall. A number of papers in connection to the research area are expected to be complete in the spring of 2004.

b. Evaluation:

The amount of public awareness about exotic earthworms has grown exponentially compared to when the study began. Resorts and fishermen are becoming aware of the issue, but given the potential impacts, there is more that should be done at a local level to increase awareness.

There are still many unanswered questions about the effect of the invasive worms; the extent of ecological damage, the effect of worming on tree productivity and the extent of the populations and species composition.

5. Ecological Classification and Inventory Project (Terrestrial EC&I)

Initiated in 1992, the Chippewa National Forest Demonstration Project is a cooperative project between the Chippewa National Forest and the Minnesota Department of Natural Resources. The purpose of the project is to demonstrate the methodology used in Ecological Classification and Inventory and to show how ecological land units may be used to address land management issues.

a. Results:

Landtype associations, landtypes, and landtype phases are three ecological units being delineated and inventoried. Map unit identification and field data collection occurred until June 2001 then lapsed as a result of personnel changes. The Bemidji Sand Plain was partially completed.

b. Evaluation:

Plans are to fund and resume the phase level inventory next year (2004).

K. WATER - LAKES AND STREAMS

1. Lakes

a. Sampling Strategy

The Forest maintains a representative set of 10 lakes that are sampled at regular intervals to determine if there is a change in water quality over time. The Forest Plan states that a significant reduction in water quality occurs when the Carlson Trophic State Index (TSI) increases by more than 15 percent from pre-1980 index values (LRMP p. IV-44). The Carlson Trophic State Index is a measure of the productivity of a lake. An increase in trophic state index represents a decrease in water quality. Trophic states of lakes are usually broken into four broad categories:

- **Oligotrophic:** TSI scores between 20 and 40. Low productivity lakes that have high transparencies (clear lakes), are often cold and deep, fishery is limited because of low productivity of plant community.
- **Mesotrophic:** TSI scores between 40 and 50. Moderately productive lakes, common in Minnesota, often support quality fishery.
- **Eutrophic:** TSI scores between 51 and 70. Highly productive lakes, experience frequent nuisance algal blooms, transparency is low, supports fishery.
- **Hypereutrophic:** TSI greater than 70. Extremely productive lakes, often clogged with vegetation, supports rough fish if any, highly subject to winter kill due to low oxygen levels, rare in Minnesota.

Beaver, Adele, Caribou, Mabel, Webster, Lake Thirteen and Little Cutfoot Sioux Lakes have been monitored since the mid-1970s. In 1989, Big Rice, Round, and Lower Sucker Lakes were added to the monitoring program. Lakes are sampled three times during the open water season on an alternating schedule so that each lake is actively monitored every two to three years. Round, Webster, Big Rice and Lower Sucker Lake were sampled in 2003.

b. Evaluation:**Table 11: Trophic State of Trend Lakes**

Lake Name	TSI Score 2003	Trophic State
Round	61.7	Eutrophic
Webster	48.3	Mesotrophic
Big Rice	53.3	Eutrophic
Lower Sucker	48.0	Mesotrophic

All of these lakes are exhibiting normal year-to-year variability for water quality.

2. Streams**a. Water quality**

Compliance with NFMA and the Forest Plan standards for stream water quality require long-term monitoring of a sub-sample of Forest streams. Six streams are currently enrolled in the long-term trend monitoring program. Simpson Creek, Fletcher Creek, and the Rice River have been monitored since the mid- 1970s. In 1990, the Mississippi, Big Fork, and Turtle Rivers were added to the monitoring program.

Water quality data is used to determine a stream water quality index value for each stream. The index represents an arbitrary scale based on weighted parameters. Values range from 0 to 100, with an index score of 100 representing the highest water quality streams for fisheries and recreational uses. A score of 0 represents very poor water quality for these same resources. The water quality index scores are useful for comparing water quality between streams and in the same stream over time (trends).

Monitoring consists of collecting water quality samples and flow data three times per site during the open water season. Streams are monitored on a rotating basis so not all streams are sampled each year. The Mississippi River, Big Fork River and Turtle River were sampled in 2003.

b. Evaluation:**Table 12: Water Quality Index Scores of Trend Streams**

Stream	Avg. index score of all years monitored	2003 index scores
Mississippi	72.63	72.9
Big Fork	74.10	70.8
Turtle River	73.48	71.1

All streams monitored show that over time water quality as measured by the indices have not changed significantly.

3. Water Quantity

Water quantity is measured and estimated during the open water season on the Mississippi River below Knutson dam and lake and river levels at Knutson Dam are measured continuously. These estimates and measurements help to regulate flows from Knutson Dam.

4. Pesticides - Groundwater

Broadcast application of pesticides has not been used on the Forest since 1990. The only pesticide use

currently approved on the Forest is selective application of glyphosate (Round Up) on poison ivy in developed recreation sites and along trails. No pesticide monitoring occurred in 2003.

5. Designated Water Uses

Twelve designated swimming areas were sampled in 2003. Fecal coliform levels were in compliance with the standard at all sites. No swimming areas were posted or closed.

6. Drinking Water Supplies

Monitoring of drinking water supplies consists of collecting and analyzing well water samples from all designated drinking water sources operated by the National Forest. Monitoring plans for individual wells, calls for monitoring on an annual, or monthly basis depending on requirements. Forty-nine wells were tested for bacteria and nitrates in 2003. Corrective action is taken on wells not meeting state guidelines for bacterial contamination. Wells are closed, corrective action is taken and do not re-open until sampling shows that they are in compliance with regulations. For a current list of Chippewa drinking water supplies and compliance with safe drinking water standards visit:

www.epa.gov/enviro/html/sdwis/sdwis_query.html , then click on the Minnesota map and scroll down to Water System ID and type in MN and the PWSID# from the table below (MN5110546).

The Minnesota Department of Health also requires that sanitary surveys be conducted on all water systems. In 2003, 98% of the sanitary surveys were completed. The Department of Health also requires that we have an Operation and Maintenance Plan for our water supplies. Operation and Maintenance (O&M) Plans have been developed for supplies that have hand pumps. O&M Plans for three pressure systems (Norway Beach Complex, Onegume and Stony Point) and for the solar pump at Horse Camp are being developed. All wells in 2003 were below the Forest and State drinking water standard of 10mg/L Nitrate nitrogen.

Table 13: Wells monitored.

Classification	Well Name/PSWID Number/Dist ID#
Noncommunity- Transient	South Pike Bay West/5110523/C-W3
Noncommunity- Transient	South Pike Bay East/5110523/C-W2
Noncommunity- Transient	Wanaki Campground/5110519/c-W9
Noncommunity- Transient	Norway Beach Campground/5110702/C-W26 well#2 - new well unique # 653985
Noncommunity- Transient	Cass Lake Campground/5110701/C-W12
Noncommunity- Transient	Cass Lake CG Handpump/5110701/C-w25
Noncommunity- Transient	Chippewa CG Handpump/5111080/C-w23
Noncommunity- Transient	Chippewa Campground/5111080/C-w22
Noncommunity- Transient	Mosomo Point Camp/5310387/D-W7
Noncommunity- Transient	Cutfoot Sioux VIC/5310600/D-AW2
Noncommunity- Transient	Williams Narrows North/5310453/D-W18
Noncommunity- Transient	Williams Narrows South/5310453/D-W10
Noncommunity- Transient	O-NE-GUM-E Camp/5310389/D-W8
Noncommunity- Transient	Plughat Camp/5310390/D-W12
Noncommunity- Transient	Tamarack Point Camp/5110525/D-W13
Noncommunity- Transient	Deer Lake South/5310383/D-W2
Noncommunity- Transient	Deer Lake North/5310383/D-W3
Noncommunity- Transient	West Seelye Camp/5310392/D-W4
Noncommunity- Transient	East Seelye Pt./5310385/d-w20

Noncommunity- Transient	West Winnie Campground/5110703/c-w7
Noncommunity- Transient	Stony Point Campground/5110524/w-w5
Noncommunity- Transient	Benjamin picnic/5040266/b-w1
Noncommunity- Transient	Noma Lake Campground/5310835/b-w2
Noncommunity- Transient	Clubhouse North Campground/5310381/m-w1
Noncommunity- Transient	Clubhouse South Campground/5310381/m-w13 -new well-Unique#661156
Noncommunity- Transient	Marcell Ranger Station/5310605/m-w8
Noncommunity- Transient	Northstar Campground North/5310388/m-w10
Noncommunity- Transient	Northstar Campground South/5310388/m-w11
Noncommunity- Transient	Mabel lake campground/5110546/w-w3
Noncommunity- Transient	Mabel lake Picnic/5110546/w-w4
Noncommunity- Nontransient	Walker Ranger Station/564968/w-w1
Nonpublic	Nushka Group Camp/5040724/c-w21
Nonpublic	Knutson Dam/5040267/C-W8
Nonpublic	Birches Picnic/5310840/D-W14
Nonpublic	Cutfoot Warehouse/5310601/D-AW4
Nonpublic	Cut foot Residence/5310382/D-AW3
Nonpublic	Cut Foot Horse Camp/5310847/d-w19
Nonpublic	Lake Erin Wayside/511079/w-w8
Nonpublic	Central shop/5111077/c-w17
Nonpublic	Webster Lake Campground/5040281/b-w6
Nonpublic	Webster Lake Picnic/5040281/b-w7
Nonpublic	Rabideau CCC Camp/5040723/b-w9
Nonpublic	Shogren Dam/5310835/b-w4
Nonpublic	Marcell Residence/5310837/m-w9
Nonpublic	Marcell Benahouse/5310838/m-w12
Nonpublic	Woodtick Trailhead/5111078/w-w7
Nonpublic	Watershed Lab/5111081/c-w18
Nonpublic	Marcell Field Lab//5310839/NC-w1 *
Nonpublic	Marcell Research Center/MRC-w1/unique#688215

L. LANDS

1. Results:

In 2003 the Chippewa National Forest acquired one tract of 2.0 acres of land using funds appropriated from the Land and Water Conservation Fund. The tract was an inholding within a larger parcel on the south shore of Leech Lake that was purchased by the Forest Service in 2001. The Forest also sold a 2.10-acre tract of land under the Small Tracts Act authority along Highway 29 between Alvwood and Dora Lake.

2. Evaluation:

At the start of 2004 the National Forest land ownership within the Chippewa National Forest was 666,522 acres, which is 50.7 percent of the land area within the boundaries of the Forest (does not include 285,300 acres of meandered water bodies within the Forest). At the start of 1986, when the current Forest Plan was approved, the National Forest land ownership was 661,441 acres, or 50.3 percent of the land area within the Forest boundaries.

The net acreage gain since the start of 1986, the first year of the current Forest Plan, is 5,081 acres, for

an average of 282 acres per year. The average acreage gain over the past five years is 51 acres per year, which reflects both decreased funding along with an emphasis on acquiring key lakeshore tracts that have risen dramatically in market value. The outlook is for limited funding that is focused on a select few high priority tracts.

Land exchanges continue to become more complex, costly and closely scrutinized at the Regional and National levels. Funding in recent years has been inadequate to complete any exchanges. The best opportunities for cost-effective exchanges are with Cass, Itasca and Beltrami Counties, for purposes of consolidating mixed ownerships. Several thousand acres are potentially available for logical exchanges with the counties.

IV. LIST OF PREPARERS

The following people collected, evaluated, or compiled data for the fiscal year 2003 Monitoring and Evaluation Report:

Name	Discipline
Sharon Klinkhammer	Forest NEPA Coordinator
Gary Swanson	Silviculturist
Mark VanTassel	Timber Specialist
Chantel Cook	Fisheries Biologist
Kim Jenkins	Budgeting & Accounting Analyst
Brenda Frenzel	Agreements Assistant
Lori Larson	Timber Resource Specialist
Andrea LeVasseur	Archaeologist
Greg Smith	Lands Specialist
John Rickers	GIS Coordinator
Jim Barott	Soils Scientist
Millie Baird	Engineer
Al Williamson	Forest Ecologist/Wildlife Biologist
Jim Gallagher	Interim Forest Ecologist/Wildlife Biologist
Mary Nordeen	Public Affairs Specialist
Mike Martin	Recreation Program Manager
Nancy Salminen	Forest Hydrologist